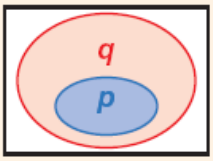
## Geometry 2.2 Study Guide: Conditional Statements (pp 81-83)

I can identify, write, and analyze the truth value of conditional statements.
I can write the inverse, converse, and contrapositive of a conditional statement.

Common Core
**CC.9-12.G.CO.9** Prove theorems about lines and angles.
**CC.9-12.G.CO.10** Prove theorems about triangles.
**CC.9-12.G.CO.11** Prove theorems about parallelograms.
**CC.9-12.G.SRT.4** Prove theorems about triangles.

### Conditional Statements

| DEFINITION | SYMBOLS | VENN DIAGRAM |
|---|---|---|
| A **conditional statement** is a statement that can be written in the form "if *p*, then *q*." | $p \rightarrow q$ |  |
| The **hypothesis** is the part *p* of a conditional statement following the word *if*. | | |
| The **conclusion** is the part *q* of a conditional statement following the word *then*. | | |



Refer to example 1 on page 81.

**1. Guided Practice: Identify the hypothesis and conclusion of the statement:** A number is divisible by 3 if it is divisible by 6.

### Writing Math

"If *p*, then *q*" can also be written as "if *p*, *q*," "*q*, if *p*," "*p* implies *q*," and "*p* only if *q*."

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Many sentences without the words *if* and *then* can be written as conditionals. To do so, identify the sentence's hypothesis and conclusion by figuring out which part of the statement depends on the other.

Refer to example 2 on page 82.

**2. Guided Practice: Write a conditional statement from the sentence:** Two angles that are complementary are acute.

A conditional statement has a _____ of either true (T) or false (F). It is false only when the hypothesis is true and the conclusion is false. To show that a conditional statement is false, you need to find only one counterexample where the hypothesis is true and the conclusion is false.

Refer to example 3 on page 82.

**3. Guided Practice:** Determine if the conditional "If a number is odd, then it is divisible by 3" is true. If false, give a counterexample.

**Remember!**

If the hypothesis is false, the conditional statement is true, regardless of the truth value of the conclusion.

**4.** What is a negation?

**5.** What is the symbol for a negation?

**Related Conditionals**

| Definition | Symbols |
|---|---|
| A conditional is a statement that can be written in the form "If $p$, then $q$." | $p \rightarrow q$ |

**Related Conditionals**

| Definition | Symbols |
|---|---|
| The **converse** is the statement formed by exchanging the hypothesis and conclusion. | $q \rightarrow p$ |

**Related Conditionals**

| Definition | Symbols |
|---|---|
| The **inverse** is the statement formed by negating the hypothesis and conclusion. | $\sim p \rightarrow \sim q$ |

**Related Conditionals**

| Definition | Symbols |
|---|---|
| The **contrapositive** is the statement formed by both exchanging and negating the hypothesis and conclusion. | $\sim q \rightarrow \sim p$ |

Refer to example 4 on page 83.

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**6. Guided Practice:** Write the converse, inverse, and contrapositive of the conditional statement "If an animal is a cat, then it has four paws." Find the truth value of each.

**7.** What are logically equivalent statements?

**9.** Which statements are logically equivalent?

**Helpful Hint**

The logical equivalence of a conditional and its contrapositive is known as the Law of Contrapositive.

**2.2 Assignment** (pp 85-86) 14, 18, 20, 22, 36, 40.